CLAIMS:

1. A multi-channel encoder (10; 600) arranged to process input signals (300, 310, 320, 330, 340; 300, 310, 610, 620, 330, 340) conveyed in N input channels to generate corresponding output signals (480, 490) conveyed in M output channels together with parametric data (450) such that M and N are integers and N is greater than M, the encoder including:

(a) a down-mixer for down-mixing the input signals to generate corresponding output signals; and

(b) an analyzer for processing the input signals either during down-mixing or as a separate process, said analyzer being operable to generate said parametric data complementary to the output signals, said parametric data describing mutual differences between the N channels of input signal so as to allow substantially for regenerating during decoding of one or more of the N channels of input signal from the M channels of output signal, said output signals being in a form compatible for reproduction in decoders providing for N or for fewer than N output channels to enable backwards compatibility.

2. An encoder according to Claim 1, wherein the encoder is a 5-channel encoder arranged to generate the output signals and parametric data in a form compatible with at least one of corresponding 2-channel stereo decoders, 3 channel decoders and 4-channel decoders.

3. An encoder according to Claim 1, wherein the analyzer includes processing means for converting the input signals by way of transformation from a temporal domain to a frequency domain and for processing these transformed input signals to generate the parametric data.

4. An encoder according to Claim 3, wherein at least one of the down-mixer and the analyzer are arranged to process the input signals as a sequence of time-frequency tiles to generate the output signals.

5. An encoder according to Claim 4, wherein the tiles are obtained by transformation of mutually overlapping analysis windows.

6. An encoder according to Claim 1, including a coder for processing the input signals to generate M intermediate audio data channels for inclusion in the M output signals, the analyzer being arranged to output information in the parametric data relating to at least one of:

(a) inter-channel input signal power ratios or logarithmic level differences;

(b) inter-channel coherence between the input signals;

(c) a power ratio between the input signals of one or more channels and a sum of powers of the input signals of one or more channels; and

(d) phase differences or time differences between signal pairs.

7. An encoder according to Claim 6, wherein in (d) said phase differences are average phase differences.

8. An encoder according to Claim 6, wherein calculation of at least one of the phase differences, coherence data and the power ratios is followed by principal component analysis (PCA) and/or inter-channel phase alignment to generate the N output signals.

9. An encoder according to Claim 1, wherein at least one of the input signals conveyed in the N channels corresponds to an effects channel.

10. An encoder according to Claim 1 adapted to generate the output signals in a form suitable for playback using conventional playback systems.

11. A method of encoding input signals conveyed in N input channels in a multi-channel encoder to generate corresponding output signals conveyed in M output channels together with parametric data such that M and N are integers and N is greater than M, the method including steps of:

(a) down-mixing the input signals to generate the corresponding output signals; and

(b) processing in an analyzer the input signals when being down-mixed or separately, said processing providing said parametric data complementary to the output

signals, said parametric data describing mutual differences between the N channels of input signal so as to allow substantially for regeneration of the N channels of input signal from the M channels of output signal during decoding, said output signals being in a form compatible for reproduction in decoders providing for N or for fewer than N channels.

12. A method according to Claim 11, adapted to encode input signals corresponding to 5-channels and generate the output signals and parametric data in a form compatible with one or more of corresponding 2-channel stereo decoders, 3 channel decoders and 4-channel decoders.

13. A method according to Claim 11, wherein said processing includes converting the input signals by way of transformation from a temporal domain to a frequency domain.

14. A method according to Claim 13, wherein at least one of the input signals are processed as a sequence of time-frequency tiles to generate the output signals.

15. A method according to Claim 14, wherein the tiles correspond to mutually overlapping analysis windows.

16. A method according to Claim 11, the method including a step of using a coder for processing the input signals to generate M intermediate audio data channels for inclusion in the output signals, the coder being arranged to output information in the parametric data relating to at least one of:

(a) inter-channel input power ratios or logarithmic level differences;

(b) inter-channel coherence between the input signals;

(c) a power ratio between the input signals of one or more channels and a sum of powers of the input signals of one or more channels; and

(d) power differences or time differences between signal pairs.

17. A method according to Claim 16, wherein the power differences are average power differences.

18. A method according to Claim 16, wherein calculation of at least one of the phase difference, the coherence data and the power ratio is followed by principal component analysis (PCA) and/or inter-channel phase alignment to generate the output signals.

19. A method according to Claim 11, wherein at least one of the input signals conveyed in the N channels corresponds to an effects channel.

20. Encoded data content being generated using the method of Claim 11.

21. Data carrier on which encoded data as claimed in Claim 20 is stored.

22. A decoder (800) operable to decode encoded output data (370, 430, 450, 480, 490, 690) as generated by an encoder (10; 600) according to Claim 1, said encoded output data (370, 430, 450, 480, 490, 690) comprising M channels (480, 490) and associated parametric data (370, 430, 450, 690) generated from input signals of N channels such that M < N where M and N are integers, the decoder (800) including a processor (810):

(a) for receiving the encoded output data (370, 430, 450, 460, 490, 690) and converting it from a time domain to a frequency domain;

(b) for applying the parametric data in the frequency domain to extract content from the M channels to regenerate from the M channels regenerated data content corresponding to input signals of one or more of N channels not directly included in or omitted from the encoded output data; and

(c) for processing the regenerated data content for outputting one or more of the regenerated input signals of N channels at one or more outputs of the decoder.

23. A decoder (800) according to Claim 22, wherein said processor (810) is operable to apply an all-pass decorrelation filter to obtain decorrelated versions of signals for use in regenerating said one or more input signals of N channels at the decoder.

24. A decoder (800) according to Claim 23, wherein the processor is operable to apply inverse encoder rotation to split signals of the M channels and decorrelated versions thereof into their constituent components for regenerating said one or more input signals of N channels at the decoder.

25. A decoder (800) according to Claim 24, said decoder (800) being operable to generate its one or more decoder outputs (1300 to 1340) solely from said encoded output data (450, 480, 490) received at the decoder (800).